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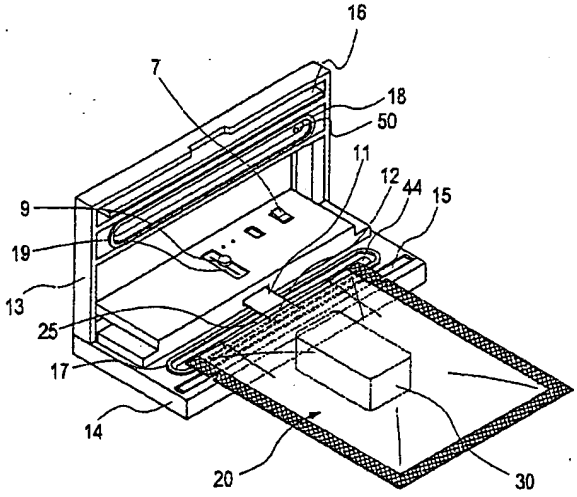
(54) Title: A VACUUM PACKING APPARATUS



(57) Abstract: Disclosed herein is a vacuum packing apparatus for creating a vacuum inside various kinds of bags to be vacuum-packed. The vacuum packing apparatus comprises a lower case, and an upper case hingedly coupled to the lower case and adapted to open or close an upper surface of the lower case. The lower case comprises a lower packing installed in the upper surface of the lower case and internally defining an elongated transversal lower space, a suction nozzle having an air inlet port positioned at the front side of the lower packing for the suction of air, a vacuum pump connected to the suction nozzle for the suction of the air, and a heating bar transversally installed at the front side of the lower packing and adapted to generate heat. The upper case comprises an upper packing installed at a position corresponding to the lower packing and configured to seal the lower space when the upper case closes the upper surface of the lower case, and a heating bar oppressive packing installed at a position corresponding to the heating bar for oppressing the heating bar according to the degree of descent thereof.

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A VACUUM PACKING APPARATUS

Technical Field

The present invention relates to a vacuum packing apparatus for creating a vacuum inside a bag to be vacuum-packed, and more particularly to a vacuum packing apparatus which improves reliability in the creation of a vacuum compared to existing vacuum packing apparatuses, and is widely applicable to various vacuum containers as well as vacuum tight bags such as plastic bags.

Background Art

In general, bags to be vacuum-packed are containers designed to encase various types of perishable materials, such as food, therein, and remove air surrounding the food for the vacuum sealing thereof in order to prevent the oxidation of the food, thereby achieving a longer shelf life of the food. Although the rotting problem of food may be solved to some degree as the food is kept at a low temperature within refrigerators, the use of such vacuum packing bags has an effect of completely preventing the food from contacting the air, resulting in an increase in a storage and preservation period of the food.

There are known various kinds of the vacuum packing bags, and some examples thereof are shown in Figs. 1 to 5 as perspective views, respectively. The shown examples of the vacuum packing bags, designated as reference numeral 20, are as follows.

Fig. 1 illustrates a general vacuum packing bag 20, such as a vinyl bag, which is fabricated by disposing two general vinyl sheets one above another, and performing the heat welding of these upper and lower vinyl sheets along their three sides.

Fig. 2 illustrates a wholly embossed vacuum packing bag 20 wherein at least one of the upper and lower vinyl sheets is embossed throughout its whole surface.

Fig. 3 illustrates a laterally embossed vacuum packing bag 20 wherein a pair of embossed vinyl strips are inserted at both sides of an interior space between the upper and lower vinyl sheets of the bag 20, respectively.

Fig. 4 illustrates an adhesive tape attached vacuum packing bag 20 wherein an adhesive tape formed with protruding lines is centrally attached to an inner surface of one of the upper and lower vinyl sheets.

Fig. 5 illustrates a general packing bag 33 formed with a seal along a central vertical axis of its lower vinyl sheet.

The above different vacuum packing bags 20 has been vacuumed by making use of various different vacuum packing apparatuses, respectively, and there has been no vacuum packing apparatus capable of achieving the vacuum packing of all of the above described bags 20 in the prior art.

Fig. 6 is a perspective view illustrating a vacuum packing apparatus using a vacuum space which has been conventionally used, shown in a state wherein the vacuum packing bag 20 is inserted therein.

Referring to Fig. 6, the conventional vacuum packing apparatus using a vacuum space comprises a lower case 14, and an upper case 13 hingedly coupled to the lower case 14 and adapted to open or close an upper surface of the lower case 14.

The lower case 14, in turn, comprises a lower packing 17 internally defining an elongated transversal lower space 44, an air inlet port 40 formed inside the lower space 44, a vacuum pump connected to the air inlet port 40 and adapted to suck air, and a heating bar 15 transversely installed at the front side of the lower packing 17 and adapted to generate heat.

The upper case 13 comprises an upper packing 18, and a heating bar oppressive packing 16. The upper packing 18 is installed at a position corresponding to the lower packing 17 and is adapted to seal the lower space 44 when the upper case 13 closes the upper surface of the lower case 14, thereby creating a vacuum inside the lower space 44. The heating bar oppressive packing 16 is installed at a position corresponding to the heating bar 15 so that it oppresses the heating bar 15 according to the degree of descent thereof.

Now, the operation of the conventional vacuum packing apparatus using a vacuum space configured as stated above will be explained.

In a state wherein food 30 to be stored and preserved within the vacuum packing bag 20 is encased therein, a mouth portion 25 of the vacuum packing bag 20 is disposed inside the lower space 44 of the lower case 14, and then the upper case 13 is rotated toward the lower case 14 so as to cause the upper packing 18 to come into close contact with the lower packing 17, thereby achieving the sealing of the lower space 44.

In this state, as the vacuum pump (not shown) is actuated by depressing a certain switch 7, it sucks air inside the lower space 44 through the air inlet port 40, thereby creating a vacuum inside the lower space 44. The existence of the vacuum inside the lower space 44, in turn, causes the air remaining inside the vacuum packing bag 20 to be sucked through the mouth portion 25 of the vacuum packing bag 20 located in the lower space 44.

After the creation of a vacuum inside the vacuum packing bag 20 is completed in the above described manner, in a state wherein the heating bar oppressive packing 16 continuously oppresses the heating bar 15, electric power is applied to the heating bar 15, thereby allowing the upper and lower vinyl sheets of the vacuum packing bag 20 to be heat welded for the sealing of the vacuum packing bag 20.

The conventional vacuum packing apparatus using a vacuum space as stated above, however, has a problem in that the application range thereof is restricted only to the embossed vacuum packing bags 20. This is because the vacuum packing apparatus sucks the air inside the vacuum packing bag 20 throughout the mouth portion 25 of the vacuum packing bag 20 located inside the lower space 44. That is, if the vacuum packing bag 20 has no embossed portion, due to the generated relatively large suction force of the air, the upper and lower vinyl sheets of the vacuum packing bag 20 are excessively adhered to each other at the mouth portion 25 thereof, thereby disenabling the evacuation of the air inside the vacuum packing bag 20.

The conventional vacuum packing apparatus using a vacuum space, therefore, cannot be used for the general vacuum packing bag 20 shown in Fig. 1, the adhesive tape attached vacuum packing bag 20 shown in Fig. 4, as well as the general packing bag 33 shown in Fig. 5. It can be restrictively used only in the wholly embossed vacuum packing bag 20 shown in Fig. 2, as a special packing bag, wherein at least one surface thereof is embossed to artificially define an air passage, and the laterally embossed vacuum packing bag 20 shown in Fig. 3. Here, the embossed special packing bags have a difficulty in manufacture, are expensive, and cannot be used for general purposes.

Fig. 7 is a perspective view illustrating another vacuum packing apparatus using a suction nozzle that has been conventionally used, shown in a state wherein a vacuum packing bag is inserted therein.

Referring to Fig. 7, the conventional vacuum packing apparatus comprises a lower case 14, and an upper case 13 hingedly coupled to the lower case 14 and adapted to open or close an upper surface of the lower case 14.

The lower case 14, in turn, comprises a transversal lower packing 17, a suction nozzle 11 having a forwardly protruding air inlet port 12 for use in the suction of air, a vacuum

pump connected to the suction nozzle 11 and adapted to suck the air, and a heating bar 15 transversely installed at the rear side of the lower packing 17 and adapted to generate heat.

The upper case 13 comprises an upper packing 18 installed at a position corresponding to the lower packing 17, and a heating bar oppressive packing (not shown) installed at a position corresponding to the heating bar 15 so that it oppresses the heating bar 15 according to the degree of descent thereof.

Now, the operation of the conventional vacuum packing apparatus using the suction nozzle 11 configured as stated above will be explained.

First, a mouth portion 25 of the vacuum packing bag 20, encasing food 30 to be stored and preserved therein, is fitted between the upper case 13 and lower case 14 of the vacuum packing apparatus, so that the suction nozzle 11 of the vacuum packing apparatus is positioned inside the vacuum packing bag 20 by passing through the mouth portion 25 of the vacuum packing bag 20.

In succession, as the vacuum pump (not shown) is actuated by depressing a certain switch 7, it sucks air inside the vacuum packing bag 20 through the suction nozzle 11, thereby creating a vacuum inside the vacuum packing bag 20.

After the creation of the vacuum inside the vacuum packing bag 20 is completed in the above described manner, the suction nozzle 11 is pulled out of the vacuum packing bag 20, and electric power is applied to the heating bar 15 in a state wherein the heating bar oppressive packing oppresses the heating bar 15, thereby allowing the upper and lower sheets of the vacuum packing bag 20 to be heat welded to each other for the sealing of the vacuum packing bag 20.

Although the conventional vacuum packing apparatus using the suction nozzle 11 as stated above is applicable to the general vacuum packing bag 20 shown in Fig. 1, and the adhesive tape attached vacuum packing bag 20 shown in Fig. 4, it is impossible to be used

for the wholly embossed vacuum packing bag 20 shown in Fig. 2, the partially embossed vacuum packing bag 20 shown in Fig. 3, and the general packing bag 33 shown in Fig. 5.

When the conventional vacuum packing apparatus using the suction nozzle 11 is used for the vacuum packing of the embossed packing bags 20, the upper and lower vinyl sheets of the vacuum packing bag 20 come into close contact with each other through the engagement of the upper and lower packings 18 and 17 while retaining an air passage defined by the suction nozzle 11. During the creation of a vacuum inside the vacuum packing bag 20, however, the outside air inevitably flows back into the vacuum packing bag 20 through gaps formed between the embossings.

In case of the general packing bag 33, likewise, since the seal formed along the central vertical axis of the lower vinyl sheet thereof serves as a gap causing the backflow of the outside air and disenabling the creation of a vacuum inside the bag 33. Thereby, it is impossible to achieve the vacuum packing of the general packing bag 33 by applying the conventional vacuum packing apparatus using the suction nozzle 11 thereto.

Disclosure of the Invention

Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide a vacuum packing apparatus, which enables the application of all kinds of various bags including general packing bags.

It is another object of the present invention to provide a vacuum packing apparatus, which is widely applicable to various containers as well as bags to be vacuum-packed.

In accordance with one aspect of the present invention, the above and other objects can be accomplished by the provision of a vacuum packing apparatus comprising a lower case, and an upper case hingedly coupled to the lower case and adapted to open or close an

upper surface of the lower case, wherein: the lower case comprises: a lower packing installed in the upper surface of the lower case and internally defining an elongated transversal lower space; a suction nozzle having an air inlet port positioned at the front side of the lower packing for the suction of air; a vacuum pump connected to the suction nozzle for the suction of the air; and a heating bar transversally installed at the front side of the lower packing and adapted to generate heat; and the upper case comprises: an upper packing installed at a position corresponding to the lower packing and configured to seal the lower space when the upper case closes the upper surface of the lower case; and a heating bar oppressive packing installed at a position corresponding to the heating bar for oppressing the heating bar according to the degree of descent thereof.

Preferably, the suction nozzle may be installed so as to move forward or rearward, and may have a nozzle lever for the forward or rearward movement thereof.

Preferably, the upper case may further comprise an air passage for an exterior container, an outlet of the air passage may be positioned in the lower space when the upper case comes into compressive contact with the upper surface of the lower case, and the outlet may be opened when an exterior connection hose is fitted thereto.

Brief Description of the Drawings

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

Figs. 1 to 5 are perspective views illustrating several examples of packing bags to be vacuum-packed, respectively;

Fig. 6 is a perspective view illustrating a conventional vacuum packing apparatus using

a vacuum space, shown in a state wherein a vacuum packing bag is inserted therein;

Fig. 7 is a perspective view illustrating another conventional vacuum packing apparatus using a suction nozzle, shown in a state wherein a vacuum packing bag is inserted therein;

Fig. 8 is a perspective view illustrating a vacuum packing apparatus in accordance with the present invention, shown in a state wherein a vacuum packing bag is inserted therein;

Fig. 9 is a perspective view illustrating a state wherein a suction nozzle is advanced compared to a position shown in Fig. 8;

Fig. 10 is a perspective view illustrating a state wherein the suction nozzle is retracted from the position shown in Fig. 8;

Fig. 11 is a perspective view illustrating the creation of a vacuum inside an exterior vacuum container by means of the vacuum packing apparatus in accordance with the present invention;

Fig. 12 is a perspective view illustrating a vacuum packing apparatus in accordance with another embodiment of the present invention;

Figs. 13 and 14 are sectional views, respectively, illustrating different examples of a vacuum switch in accordance with the present invention;

Fig. 15 is a side sectional view illustrating an installed state of an impurity collecting container provided in the vacuum packing apparatus in accordance with another embodiment of the present invention; and

Fig. 16 is a perspective view illustrating a vacuum packing apparatus in accordance with yet another embodiment of the present invention.

Best Mode for Carrying Out the Invention

Reference will now be made in greater detail to a preferred embodiment of the

invention, an example of which is illustrated in the accompanying drawings. Wherever possible, the same reference numerals will be used throughout the drawings and the description to refer to the same or like parts.

Fig. 8 is a perspective view illustrating a vacuum packing apparatus in accordance with the present invention, shown in a state wherein a vacuum packing bag is inserted therein.

Referring to Fig. 8, the vacuum packing apparatus of the present invention basically comprises a lower case 14, and an upper case 13. The upper case 13 is hingedly coupled to the lower case 14 so as to open or close an upper surface of the lower case 14. When it is desired to create a vacuum inside a vacuum packing bag 20, the upper case 13 is pushed down so as to close the upper surface of the lower case 14. Then, after the creation of a vacuum inside the vacuum packing bag 20 is completed, the upper case 13 is spaced apart from the lower case 14 so as to open the upper surface of the lower case 14.

In the upper surface of the lower case 14 is installed a lower packing 17. The lower packing 17 has an elliptical or rectangular form so as to internally define an elongated transversal lower space 44. During the creation of a vacuum by the vacuum packing apparatus of the present invention, inside the lower space 44 defined within the lower packing 17 is positioned a mouth portion 25 of the vacuum packing bag 20.

The lower case 14 is further installed with a suction nozzle 11 so that its air inlet port 12 is positioned at the front side of the lower packing 17 for the suction of air. The suction nozzle 11 is inserted into the vacuum packing bag 20 through the mouth portion 25 thereof and is adapted to create a vacuum inside the vacuum packing bag 20. The suction nozzle 11 is further adapted to suck air out of the lower space 44, thereby achieving a vacuum space therein.

Considering the creation of the vacuum by the suction nozzle 11 in detail, first, the mouth portion 25 of the vacuum packing bag 20 is positioned inside the lower space 44,

and the suction nozzle 11 is inserted into the vacuum packing bag 20. Then, the upper case 13 is pushed down to close the upper surface of the lower case 14. In this state, as the suction nozzle 11 sucks the air remaining within the vacuum packing bag 20, the air inside the lower space 44 is drawn into the vacuum packing bag 20 through a gap defined in the mouth portion 25 of the vacuum packing bag 20. The drawn air, in turn, is completely sucked by the suction nozzle 11, thereby accomplishing a vacuum space within the lower space 44.

By virtue of the vacuum space accomplished within the lower space 44, regardless of whether the vacuum packing bag 20 is the embossed vacuum packing bag or other general packing bag, it is possible to completely prevent the outside air from flowing back into the vacuum packing bag 20. Therefore, according to the present invention, all kinds of vacuum packing bags, including the embossed or non-embossed general ones, can be easily vacuum packed.

Meanwhile, although an outlet of the suction nozzle 11 is not shown, it will be clearly understood that it is connected to a vacuum pump as air suction means.

The lower case 14, furthermore, is transversely installed with a heating bar at the front side of the lower packing 17. The heating bar 15 serves to generate heat after creating the vacuum within the vacuum packing bag 20, thereby sealing the mouth portion 25 of the vacuum packing bag 20 by heat welding.

The upper case 13 is installed with an upper packing 18 at a position corresponding to the lower packing 17. The upper packing 18 takes the same shape as that of the lower packing 17 so that it is able to seal the lower space 44 when the upper case 13 closes the upper surface of the lower case 14. The sealed lower space 44, therefore, can be a vacuum space.

The upper case 13 is further installed with a heating bar oppressive packing 16 at a

position corresponding to the heating bar 15. When the upper case 13 descends, and closes the lower case 14, the heating bar oppressive packing 16 serves to oppress the heating bar 15. Such an oppression of the heating bar oppressive packing 16 enables the heating bar 15 to more easily perform the heat welding of the mouth portion 25 of the vacuum packing bag 20.

Now, the operation of the vacuum packing apparatus in accordance with the present invention will be explained.

As shown in Fig. 8, in an opened state of the upper case 13, the vacuum packing bag 20 is mounted in the vacuum packing apparatus so that the suction nozzle 11 is inserted into the vacuum packing bag 20, and the mouth portion 25 of the vacuum packing bag 20 is positioned inside the lower space 44.

In succession, the upper case 13 is pushed down to close the upper surface of the lower case 14, and a vacuum pump actuating switch 7 is turned ON to actuate the vacuum pump (not shown in the drawing). As the vacuum pump is actuated, the suction nozzle 11, connected with the vacuum pump, sucks air through the inlet port 12, thereby creating a vacuum within the vacuum packing bag 20.

After the interior space of the vacuum packing bag 20 is vacuumed in the above described manner, the air inside the lower space 44 is drawn into the vacuum packing bag 20 through the gap defined in the mouth portion 25 of the vacuum packing bag 20. In the vacuum state, since an inner pneumatic pressure of the vacuum packing bag 20 is lowered than that of the lower space 44 in which the mouth portion 25 of the vacuum packing bag is positioned, the air within the lower space 44 is drawn back into the vacuum packing bag 20 through the gap defined in the mouth portion 25 thereof.

Such an air backflow phenomenon into the vacuum packing bag 20, especially, prominently appears in case of the embossed vacuum packing bag 20.

In the present invention, however, since the lower space 44 is sealed before the creation of the vacuum, the air within the lower space 44 is completely drawn into the vacuum packing bag 20, and, in turn, is sucked by the suction nozzle 11 until no air remains inside the lower space 44. Thereby, the lower space 44 is changed into a vacuum space.

After the lower space 44 is vacuumed, since the air is no longer drawn back into the vacuum packing bag 20, the vacuum packing bag 20 reaches a complete vacuum state.

After the vacuum packing bag 20 is vacuumed in this manner, the vacuum pump actuating switch 7 is turned OFF automatically or manually. Then, the heating bar oppressive packing 16 descends automatically or manually to oppress the heating bar 15, thereby actuating the heating bar 15 to generate heat. The heat generated by the heating bar 15 and the pressure applied by the heating bar oppressive packing 16 are used for the heat welding of the mouth portion 25 of the vacuum packing bar 20, thereby achieving the vacuum sealing of the vacuum packing bag 20.

Finally, as the upper case 13 is rotated so as to open the upper surface of the lower case 14, and then the vacuum packing bag 20, which is completely vacuum packed, is separated from the vacuum packing apparatus of the present invention, the overall process of the present invention is completed.

By virtue of the fact that the suction nozzle 11 is used to suck the air inside the vacuum packing bag 20, and furthermore to create a vacuum inside the lower space 44 in which the mouth portion 25 of the vacuum packing bag 20 is located, the vacuum packing apparatus of the present invention can accomplish ease of vacuum packing of both embossed and non-embossed vacuum packing bags, as well as general packing bags formed with a seal along the central vertical axis of its lower vinyl sheet.

Fig. 9 is a perspective view illustrating a state wherein the suction nozzle is advanced

compared to a position shown in Fig. 8, and Fig. 10 is a perspective view illustrating a state wherein the suction nozzle is retracted compared to the position shown in Fig. 8.

As shown in Figs. 9 and 10, the suction nozzle 11 of the present invention is installed in the lower case 14 so that it can move forward or rearward. For this, the lower case 14 is formed at the upper surface thereof with an incision 19 extending in a forward and rearward direction. By passing through the incision 19, a nozzle lever 9 is coupled to the suction nozzle 11 so as to move the suction nozzle 11 forward and rearward.

As a result of the suction nozzle 11 being advanced as shown in Fig. 9 according to the operation of the nozzle lever 9, the air inlet port 12 of the suction nozzle 11 can be positioned close to the food existing in the interior space of the vacuum packing bag 20. This has an effect of preventing a deterioration in the air suction efficiency of the suction nozzle 11, which may generate when the upper and lower vinyl sheets of the vacuum packing bag 20 come into close contact with each other in the vicinity of the air inlet port 12 of the suction nozzle 11. Therefore, in this advanced position, the suction nozzle 11 can successfully perform the cration of a vacuum inside the vacuum packing bag 20.

On the contrary, in case that the suction nozzle 11 is retracted as shown in Fig. 10 according to the operation of the nozzle lever 9, for the installation of the vacuum packing bag 20, the mouth portion 25 of the vacuum packing bag 20 is simply positioned inside the lower space 44 without an insertion step of the suction nozzle 11 into the vacuum packing bag 20. In this case, the lower space 44 directly reaches a vacuum space by the suction nozzle 11, and thus the vacuum packing bag 20 can be vacuumed in the same manner as that achieved by the conventional vacuum packing apparatus using a vacuum space.

The suction nozzle 11 in such a retracted state, therefore, is useful in the creation of a vacuum inside the embossed vacuum packing bag 20. Since it is unnecessary to insert the suction nozzle 11 into the vacuum packing bag 20, therefore, the overall vacuum

packing process of the bag 20 can be simplified.

Fig. 11 is a perspective view illustrating the creation of a vacuum inside an exterior vacuum container by means of the vacuum packing apparatus in accordance with the present invention;

Such creation of a vacuum inside the exterior vacuum container, designated as reference numeral 55, can be accomplished in a state wherein the suction nozzle 11 is retracted as shown in Fig. 10 so as to create a vacuum inside the lower space 44.

For the vacuum packing of the exterior container 55, the upper case 13 of the vacuum packing apparatus in accordance with the present invention is further formed with an air passage 50 for providing communication between the exterior container 55 and the vacuum packing apparatus. A not shown outlet of the air passage 50 is positioned in the lower space 44 when the upper case 13 comes into compressive contact with the upper surface of the lower case 14. The air passage 50 is designed so that the outlet is opened only when a connection hose 53 is fitted therein.

In other words, the outlet of the air passage 50 is not opened when it is unnecessary to fit the connection hose 53 therein, thereby preventing the outside air from being drawn into the lower space 44 even if the lower space 44 is vacuumed by the air suction of the suction nozzle 11. When the connection hose 53 is fitted and thus the outlet is opened, the suction nozzle 11 sucks the outside air drawn into the vacuum space through the open outlet of the air passage 50. The other end of the connection hose 53 is fitted to the exterior vacuum container 55. In this way, the vacuum packing apparatus of the present invention can easily create a vacuum inside the exterior vacuum container 55.

Fig. 12 is a perspective view illustrating a vacuum packing apparatus in accordance with another embodiment of the present invention. This embodiment is similar to the previously described embodiment except that the air passage 50 for the exterior container

55 is formed in the upper surface of the lower case 14 at the rear outer side of the lower packing 17 internally defining the lower space 44.

Considering again the previously described embodiment, the air passage 50 for the exterior container 55 is formed at the upper case 13 so that it is positioned inside the lower space 44 defined by the lower packing 17 as the upper case 13 comes into compressive contact with the upper surface of the lower case 14.

In such a state, if the connection hose 53 is fitted into the air passage 50 as shown in Fig. 11, and the lower space 44 is vacuumed, the air inside the lower space 44 is drawn toward the vacuum pump through the suction nozzle 11, and at the same time, the air remaining inside the exterior container 55 is drawn through a vacuum line extending from the lower space 44 to the air passage 50 and the suction nozzle 11. In this way, the exterior container 15 can reach a vacuum state.

When the air passage 50 for the exterior container is formed at the upper surface of the lower case 14 as shown in Fig. 12, and a connection hose (not shown) is fitted into the air passage 50, the exterior container 55 can be vacuumed regardless of the creation of a vacuum inside the lower space 44.

In the present embodiment, although not shown in the drawing, the air passage 50 is connected to a vacuum pump installed inside the lower case 14 through a tube, and the suction nozzle 11, in the same manner as the previously described embodiment, is connected to the vacuum pump through another tube.

That is, when the exterior container air passage 50 is installed at a certain position of the upper surface of the lower case 14 at the rear outer side of the lower packing 17, it is unnecessary to create a vacuum inside the lower space 44 before the vacuum packing of the exterior container 55.

In a state wherein the connection hose 53 is fitted into the exterior container air

passage 50, as described in the previous embodiment in relation to Fig. 11, the upper case 13 is pushed down to close the upper surface of the lower case 14, and the vacuum pump is actuated by turning ON the switch 7, thereby allowing the air remaining inside the exterior container 55 to be drawn toward the vacuum pump through the tube associated with the vacuum pump. This is because the exterior container air passage 50 is connected to the vacuum pump through the tube. In this way, the exterior container 55 can reach a vacuum state.

Since the suction nozzle 11 is connected to the vacuum pump through the tube, it sucks the air according to the operation of the vacuum pump. In order to create a vacuum in the exterior container 55 without creating a vacuum inside the lower space 44, however, the vacuum packing apparatus of the present invention may comprises a valve between the suction nozzle 11 and the vacuum pump, and a valve between the exterior container air passage 50 and the vacuum pump. The switching of these valves (not shown in the drawing) is controlled by electric signals so that they are selectively switched On/Off as occasion demands.

To the tube connecting between the vacuum pump and the exterior container air passage 50 may be installed a vacuum switch. The vacuum switch serves to confirm the vacuum state of the exterior container 55, and output electric signals when the exterior container 55 reaches a desired vacuum level.

As can be seen from Fig. 12, additionally, a light emitting lamp 81 is installed at a certain position of the upper surface of the lower case 14. The light emitting lamp 81 is designed to be turned ON/OFF by the electric signals outputted from the vacuum switch. When the exterior container 55 reaches a desired vacuum level, therefore, the light emitting lamp 81 is automatically turned ON, thereby enabling the confirmation of vacuum degree.

Fig. 13 is a sectional view illustrating one example of the vacuum switch.

As shown in Fig. 13, the vacuum switch comprises an upper housing 91 having a connector 91a at one side thereof for use in the connection of the vacuum pump, and a lower housing 95 connected to a lower end of the upper housing 91 so as to define an interior space along with the upper housing 91. The lower housing 95 is made of a rubber material, and is installed at an inner bottom surface thereof with a first conductor 93a. The first conductor 93a is electrically connected with one side terminal of the light emitting lamp 81 shown in Fig. 12. Within the interior space defined by the upper and lower housings 91 and 95 is installed an elastic spring 97 so that its one end is fixed to an inner top surface of the upper housing 91, and the other end thereof is fixed to the inner bottom surface of the lower housing 95. To the inner top surface of the upper housing 91 is fixedly installed a second conductor 93b, which is designed to receive electric power having a first polarity. The second conductor 93b is electrically connected to or disconnected from the first conductor 93a according to the constriction and expansion of the lower housing 95.

In case of the vacuum switch configured as stated above, when the interior space defined by the upper and lower housings 91 and 95 are not in a vacuum state, the first conductor 93a is spaced apart from the second conductor 93b, thereby disenabling the application of the electric power to the light emitting lamp 81.

If the air remaining in the interior space is released through the connector 91a according to the operation of the vacuum pump, resulting in a vacuum state in the interior space, the lower housing 95 made of a rubber material is constricted toward the upper housing 91.

As a result, the first conductor 93a installed at the inner bottom surface of the lower housing 95 comes into electrical contact with the second conductor 93b, thereby allowing

the electric power to be applied to the light emitting lamp 81 so as to activate it.

Fig. 14 illustrates another example of the vacuum switch, which is similar to that shown in Fig. 13 from the view of its operation principle, except that an elastic member 99, made of a rubber material, is interposed between the upper and lower housings 91 and 95. Considering again the configuration of the vacuum switch shown in Fig. 13, when the interior space defined by the upper and lower housings 91 and 95 reaches a vacuum state, the rubber lower housing 95 is constricted toward the upper housing 91, thereby causing the first conductor 93a to come into electrical contact with the second conductor 93b. Differently from the vacuum switch shown in Fig. 13, the vacuum switch shown in Fig. 14 is configured in such a fashion that the rubber elastic member 99 is constricted toward the upper housing 91 when the interior space defined by the upper and lower housings 91 and 95 reaches a vacuum state, thereby causing the first conductor 93a installed at the inner bottom surface of the lower housing 95 to come into electrical contact with the second conductor 93b.

In case of the vacuum switch shown in Fig. 14, when the interior space defined by the upper and lower housings 91 and 95 is not in the vacuum state, the elastic member 99 maintains an expanded state of the vacuum switch, thereby allowing the first and second conductors 93a and 93b to be spaced apart from each other, and maintaining an electrical disconnection state therebetween.

Then, if the air remaining within the interior space is released through the connector 91a according to the operation of the vacuum pump, resulting in a vacuum state in the interior space, the elastic member 99 is constricted and thus the lower housing 95 is lifted toward the upper housing 91.

As a result, the first conductor 93a installed at the inner bottom surface of the lower housing 95 comes into electrical contact with the second conductor 93b, thereby allowing

the electric power to be applied to the light emitting lamp 81 so as to activate it.

For reference, the elastic spring 97 included in the vacuum switches shown in Figs. 13 and 14 serves to space the first and second conductors 93a and 93b from each other by a constant distance in order to prevent electrical contact therebetween when the interior space defined by the upper and lower housings 91 and 95 is not in the vacuum state. In the vacuum state of the interior space, as the lower housing 95 is constricted or moved upward toward the upper housing 91, the elastic spring 97 is constricted along with the lower housing 95.

The upper housings 91 of the vacuum switches shown in Figs. 13 and 14 is preferably made of a plastic material. The lower housing 95 of the example shown in Fig. 13 is preferably made of a rubber material, while the lower using 95 of the example shown in Fig. 14 may be made of a plastic material.

During the vacuum packing of bags fitted inside the vacuum packing apparatus or exterior containers located out of the vacuum packing apparatus, meanwhile, there may be a risk that impurities contained in the bags or containers are drawn along with the air through the suction nozzle 11 or the exterior container air passage 50. The drawn impurities are often drawn to the vacuum pump, causing it to malfunction.

In order to solve the above malfunction problem, as shown in Fig. 15, an impurity collecting container 100 is installed at an appropriate position between the vacuum pump, suction nozzle 11, and the exterior container air passage 50, thereby serving to separate and collect the impurities contained in the drawn air so as to prevent them from reaching the vacuum pump.

For reference, Fig. 15 is a side sectional view of Fig. 8 illustrating important portions thereof. Here, reference numeral 11 designates a suction nozzle, reference numeral 100a designates a suction hose extending between the suction nozzle 11 and the impurity

collecting container 100, reference numeral 100b designates a tube connected to the exterior container air passage 50, and reference numeral 100c designates a tube connected to the vacuum pump.

The impurity collecting container 100 is detachably fastened to the lower case 14 in an air tight manner sufficient to maintain a vacuum state inside the lower case 14.

Fig. 16 is a perspective view illustrating a vacuum packing apparatus in accordance with yet another embodiment of the present invention. Comparing to the above described two embodiments, the present embodiment has a difference in that elastic pads substitute for the upper and lower packings 18 and 17.

When the upper case 13 comes into compressive contact with the upper surface of the lower case 14, the thickness of the suction nozzle 11 makes it impossible to achieve tight contact between the upper and lower cases 13 and 14. In consideration of this problem, the upper and lower packings 18 and 17 secure the close contact between the upper and lower cases 13 and 14, thereby preventing the outside air from being drawn into the vacuum packing bag 20 and the lower space 44 through both side regions of the suction nozzle 11.

In the present embodiment shown in Fig. 16, the lower packing 17 is substituted by a first elastic pad 111, and the upper packing 18 is substituted by a second elastic pad 113. In the same manner as the previous embodiments, when the upper case 13 compresses the upper surface of the lower case 14, the first and second elastic pads 111 and 113 achieve sufficient tight contact between the upper and lower cases 13 and 14 at both the side regions of the suction nozzle 11 by virtue of their enhanced sufficient elasticity.

In the present embodiment, therefore, there is no space at both sides of the suction nozzle 11, thereby more completely preventing the outside air from being drawn into the vacuum packing bag.

Industrial Applicability

As apparent from the above description, the present invention provides a vacuum packing apparatus which is applicable to all kinds of various bags to be vacuum-packed including general packing bags by virtue of adopting a vacuum space and a suction nozzle together, and is further effectively applicable to various vacuum containers.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims

1. A vacuum packing apparatus comprising a lower case, and an upper case hingedly coupled to the lower case and adapted to open or close an upper surface of the lower case, wherein:

the lower case comprises:

a lower packing installed in the upper surface of the lower case and internally defining an elongated transversal lower space;

a suction nozzle having an air inlet port positioned at the front side of the lower packing for the suction of air;

a vacuum pump connected to the suction nozzle for the suction of the air; and

a heating bar transversally installed at the front side of the lower packing and adapted to generate heat; and

the upper case comprises:

an upper packing installed at a position corresponding to the lower packing and configured to seal the lower space when the upper case closes the upper surface of the lower case; and

a heating bar oppressive packing installed at a position corresponding to the heating bar for oppressing the heating bar according to the degree of descent thereof.

2. The apparatus as set forth in claim 1, wherein the suction nozzle is installed so as to move forward or rearward, and has a nozzle lever for the forward or rearward movement thereof.

3. The apparatus as set forth in claim 2, wherein the upper case further comprises an air

passage for an exterior container, an outlet of the air passage being positioned in the lower space when the upper case comes into compressive contact with the upper surface of the lower case, the outlet being opened when an exterior connection hose is fitted thereto.

4. A vacuum packing apparatus comprising a lower case, and an upper case hingedly coupled to the lower case and adapted to open or close an upper surface of the lower case, wherein:

the lower case comprises:

a lower packing installed in the upper surface of the lower case and internally defining an elongated transversal lower space;

a suction nozzle having an air inlet port positioned at the front side of the lower packing for the suction of air;

a vacuum pump connected to the suction nozzle for the suction of the air;

an air passage for an exterior container located out of the apparatus, the air passage being connected to the vacuum pump and installed in an upper surface of the lower case at the rear outer side of the lower space, thereby serving to draw air remaining inside the exterior container when a connection hose is connected between the air passage and exterior container; and

a heating bar transversally installed at the front side of the lower packing so as to generate heat; and

the upper case comprises:

an upper packing installed at a position corresponding to the lower packing and configured to seal the lower space when the upper case closes the upper surface of the lower case; and

a heating bar oppressive packing installed at a position corresponding to the heating

bar for oppressing the heating bar according to the degree of descent thereof.

5. The apparatus as set forth in claim 4, wherein the vacuum pump is connected to the suction nozzle and exterior container air passage through tubes, respectively, each of the tubes being installed with a valve designed to be opened or closed according to electric signals, thereby allowing the vacuum pump to selectively communicate with the suction nozzle or the exterior container air passage.

6. The apparatus as set forth in claim 5, wherein: the tube connecting the vacuum pump and exterior container air passage is further installed with a vacuum switch serving to confirm a vacuum state of the exterior container and output electric signals when the exterior container reaches a desired vacuum level; and

the lower case further comprises a light emitting lamp installed at a certain position of the upper surface thereof and designed to be turned ON/OFF according to the electric signals outputted from the vacuum switch.

7. The apparatus as set forth in claim 6, wherein the vacuum switch includes:

an upper housing having a connector formed at one side thereof for the connection of the vacuum pump;

a lower housing connected to a lower end of the upper housing so as to define an interior space along with the upper housing, the lower housing being made of a rubber material;

a first conductor installed at an inner bottom surface of the lower housing, the first conductor being electrically connected to one side terminal of the light emitting lamp;

an elastic spring fixed at one end to an inner top surface of the upper housing, and at

the other end to the inner bottom surface of the lower housing; and

a second conductor fixed to the inner top surface of the upper housing so that it is electrically connected to or disconnected from the first conductor according to the constriction and expansion of the lower housing, the second conductor being adapted to receive electric power having a first polarity.

8. The apparatus as set forth in claim 5, wherein the lower case further comprises an impurity collecting container fastened to a lower surface of the lower case and serving to separate and collect impurities contained in the drawn air through the suction nozzle and exterior container air passage.

9. A vacuum packing apparatus comprising a lower case, and an upper case hingedly coupled to the lower case and adapted to open or close an upper surface of the lower case, wherein:

the lower case comprises:

a first elastic pad installed at the upper surface of the lower case;

a suction nozzle configured to suck air through an air inlet port located at the front side of the first elastic pad;

a vacuum pump connected to the suction nozzle for the suction of the air;

an air passage for an exterior container located out of the apparatus, the air passage being connected to the vacuum pump and installed at an upper surface of the lower case at the rear outer side of the first elastic pad, thereby serving to draw air remaining inside the exterior container when a connection hose is connected between the air passage and exterior container; and

a heating bar transversally installed at the front side of the first elastic pad so as to

generate heat; and

the upper case comprises:

a second elastic pad installed at a position corresponding to the first elastic pad and configured to come into close contact with the first elastic pad when the upper case closes the upper surface of the lower case; and

a heating bar oppressive packing installed at a position corresponding to the heating bar for oppressing the heating bar according to the degree of descent thereof.

10. The apparatus as set forth in claim 9, wherein one of the first and second elastic pads has an elongated ring shape internally defining a space.

11. The apparatus as set forth in claim 9, wherein the vacuum pump is connected to the suction nozzle and exterior container air passage through tubes, respectively, each of the tubes being installed with a valve designed to be opened or closed according to electric signals, thereby allowing the vacuum pump to selectively communicate with the suction nozzle or the exterior container air passage.

12. The apparatus as set forth in claim 11, wherein: the tube connecting the vacuum pump and exterior container air passage is further installed with a vacuum switch serving to confirm a vacuum state of the exterior container and output electric signals when the exterior container reaches a desired vacuum level; and

the lower case further comprises a light emitting lamp installed at a certain position of the upper surface thereof and designed to be turned ON/OFF according to the electric signals outputted from the vacuum switch.

13. The apparatus as set forth in claim 12, wherein the vacuum switch includes:

an upper housing having a connector formed at one side thereof for the connection of the vacuum pump;

a lower housing connected to a lower end of the upper housing so as to define an interior space along with the upper housing;

a first conductor installed at an inner bottom surface of the lower housing, the first conductor being electrically connected to one side terminal of the light emitting lamp;

an elastic spring fixed at one end to an inner top surface of the upper housing, and at the other end to the inner bottom surface of the lower housing;

an elastic member inserted between the upper and lower housings and designed to be constricted when the interior space is in a vacuum state; and

a second conductor fixed to the inner top surface of the upper housing so that it is electrically connected to or disconnected from the first conductor according to the constriction and expansion of the elastic member, the second conductor being adapted to receive electric power having a first polarity.

14. The apparatus as set forth in claim 12, wherein the lower case further comprises an impurity collecting container fastened to a lower surface of the lower case and serving to separate and collect impurities contained in the drawn air through the suction nozzle and exterior container air passage.

Fig. 1

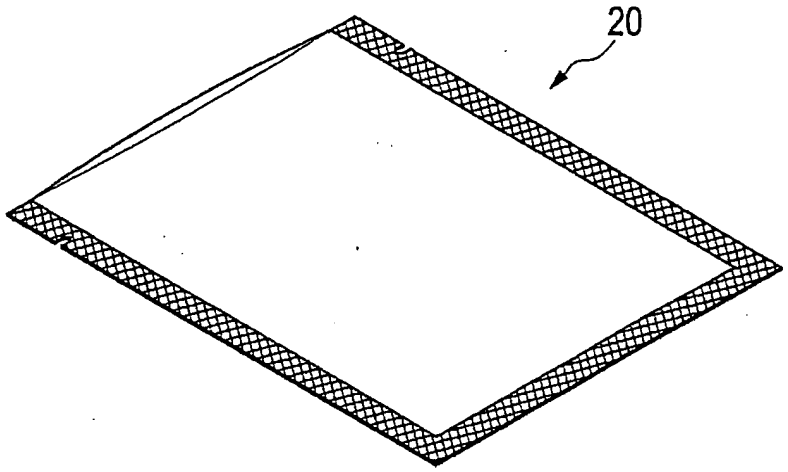


Fig. 2

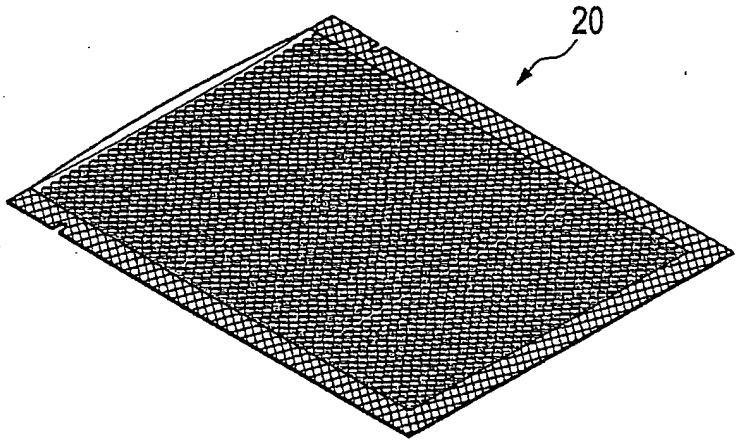


Fig. 3

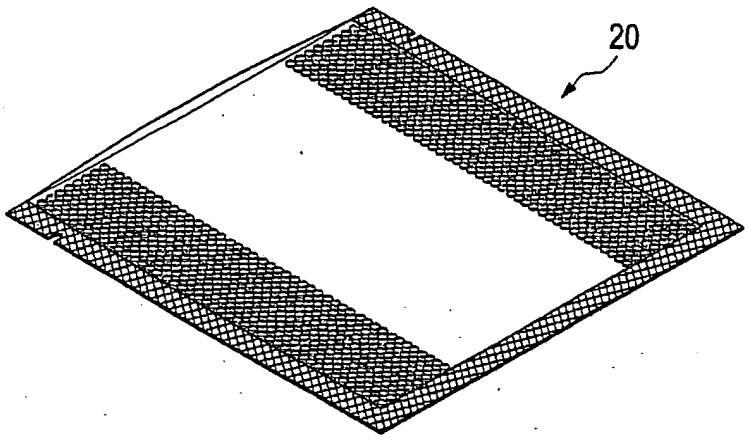


Fig. 4

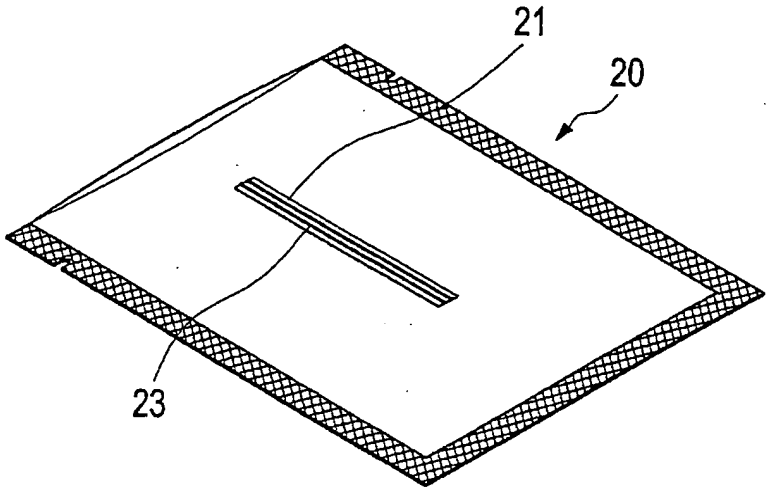


Fig. 5

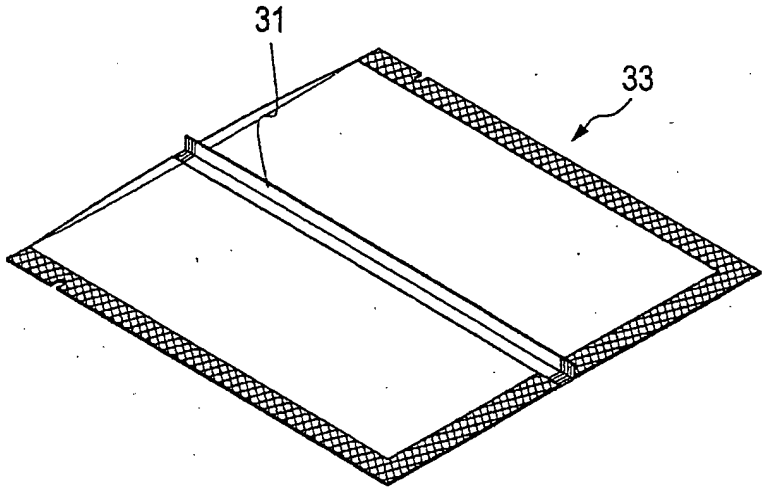


Fig. 6

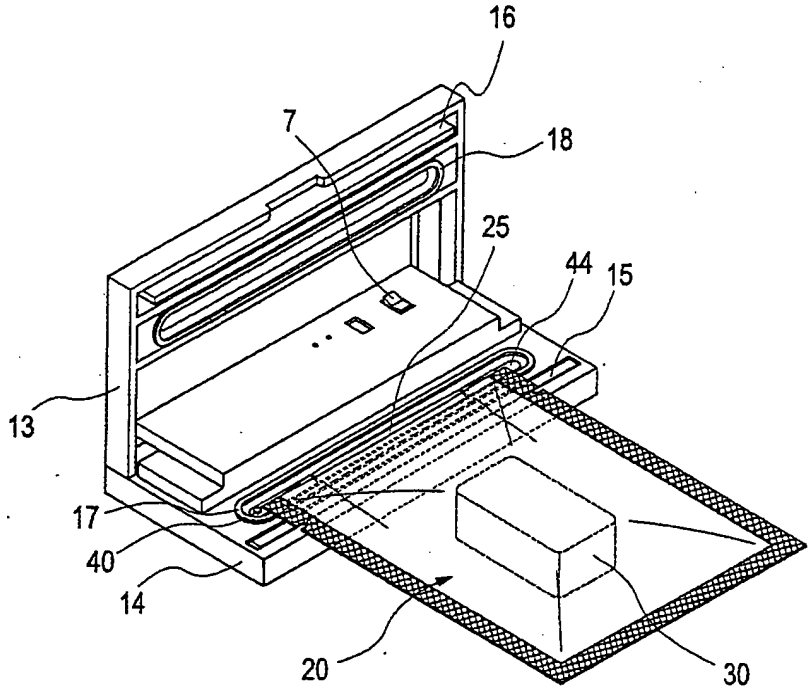


Fig. 7

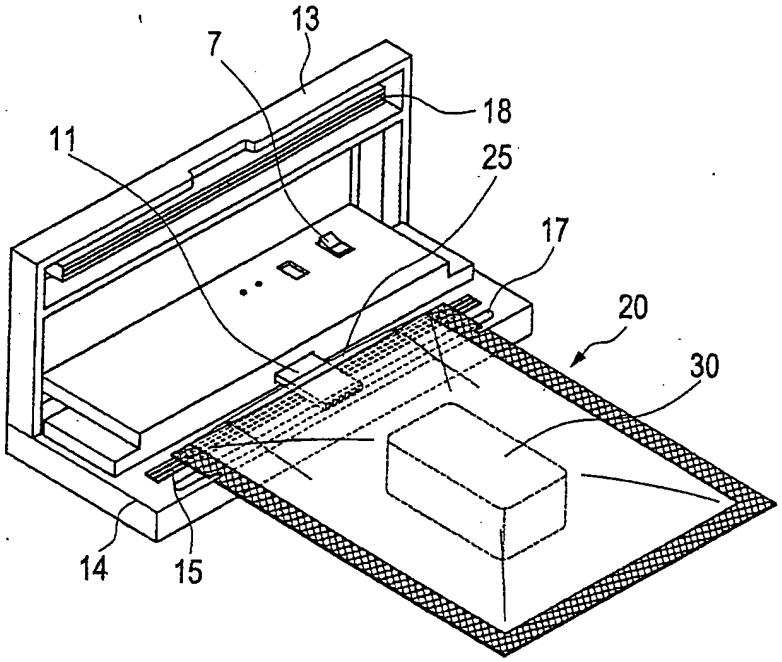


Fig. 8

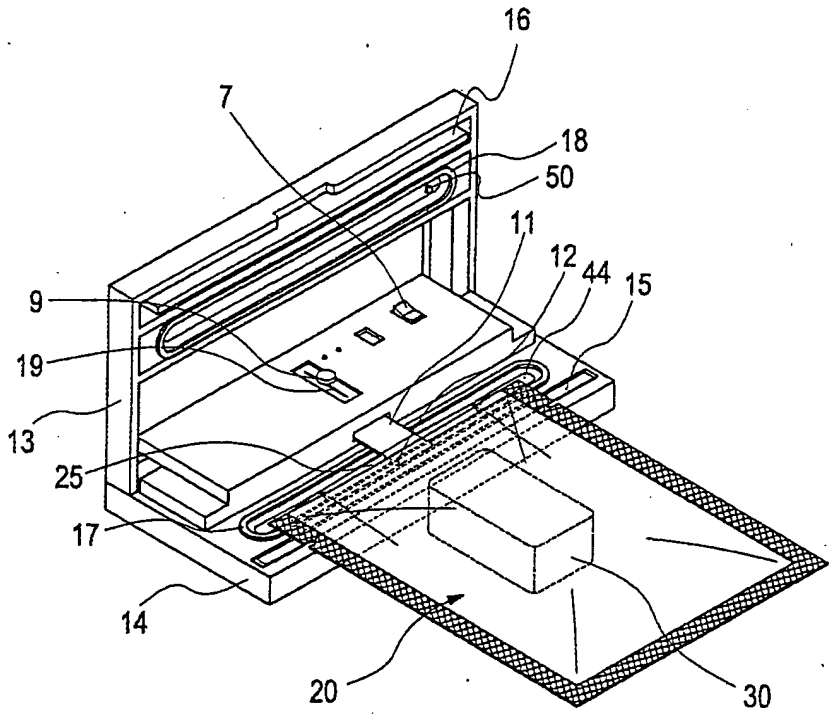


Fig. 9

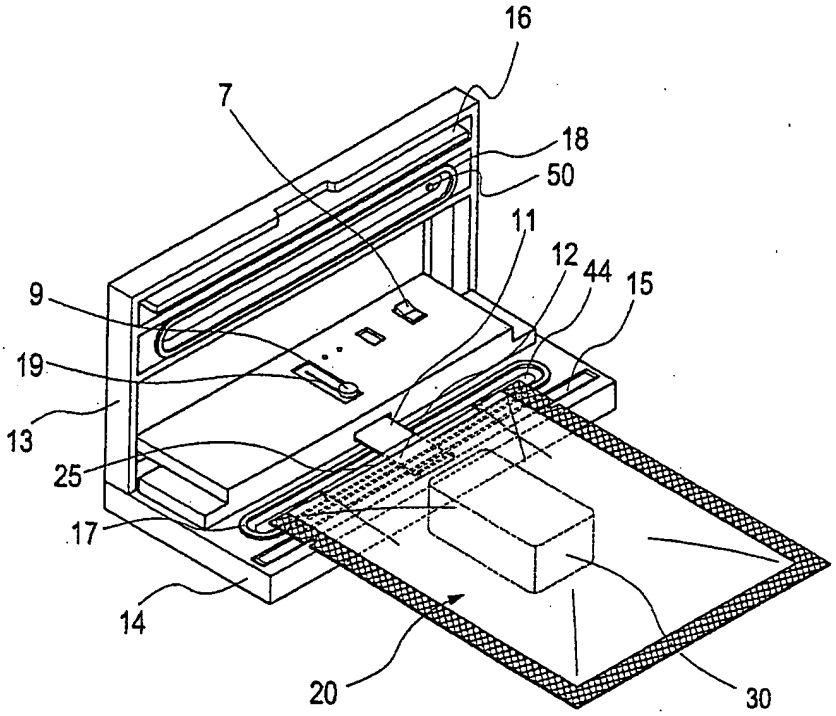


Fig. 10

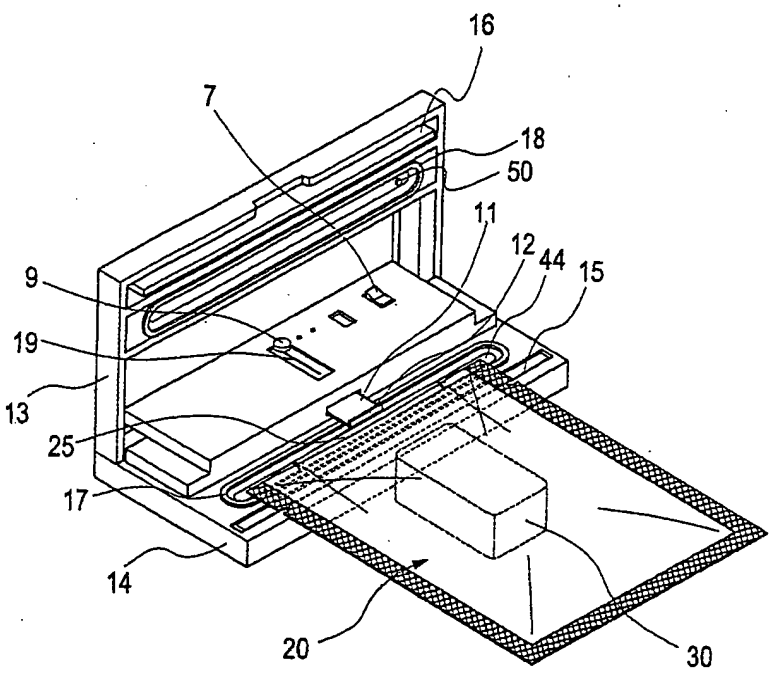


Fig. 11

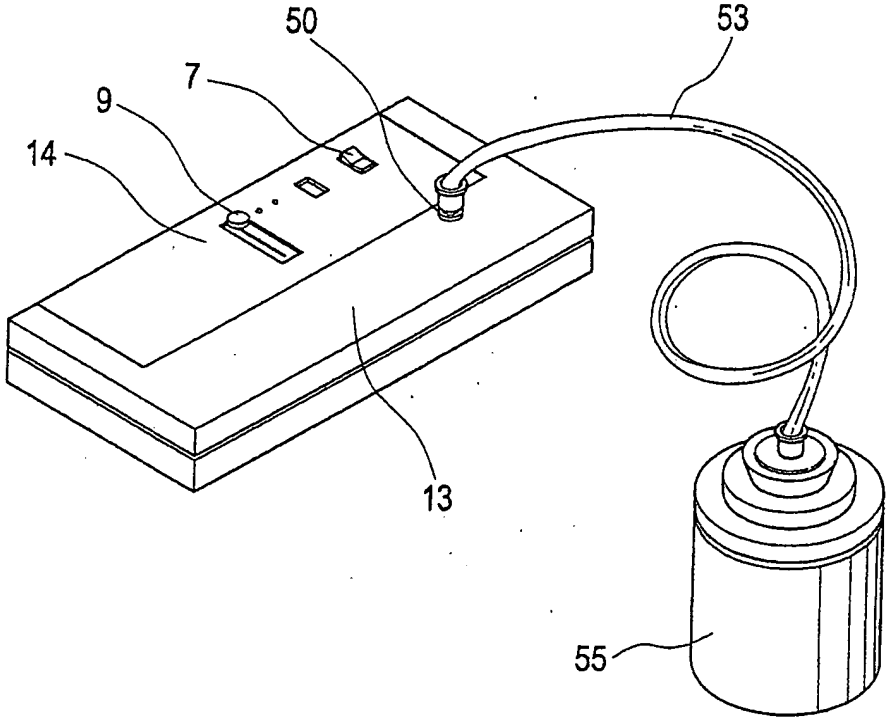


Fig. 12

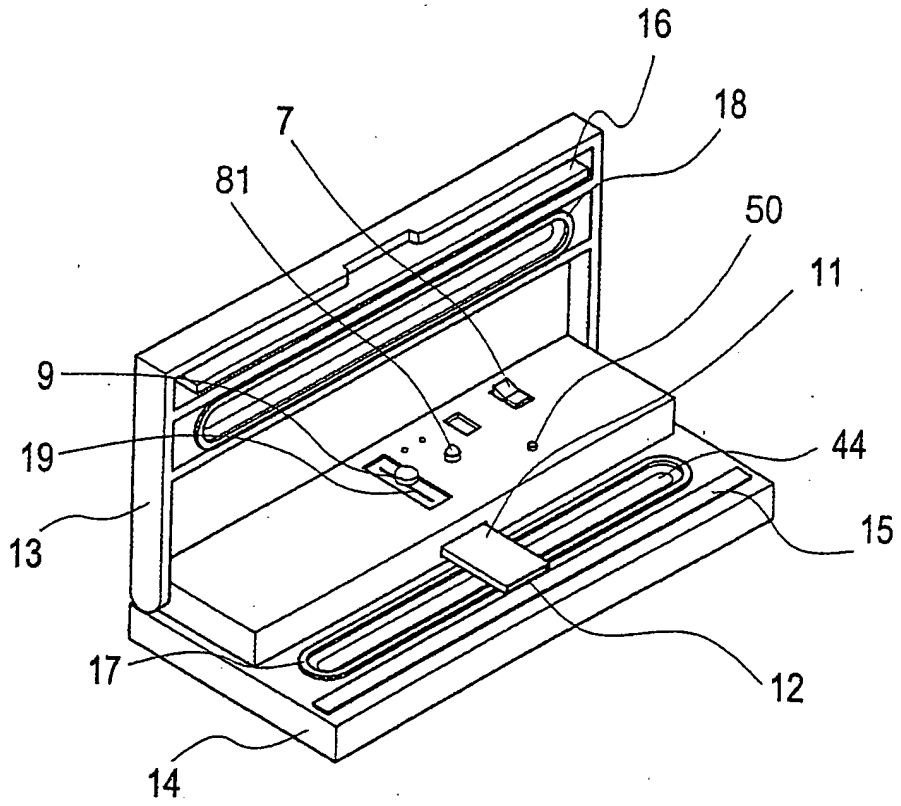


Fig. 13

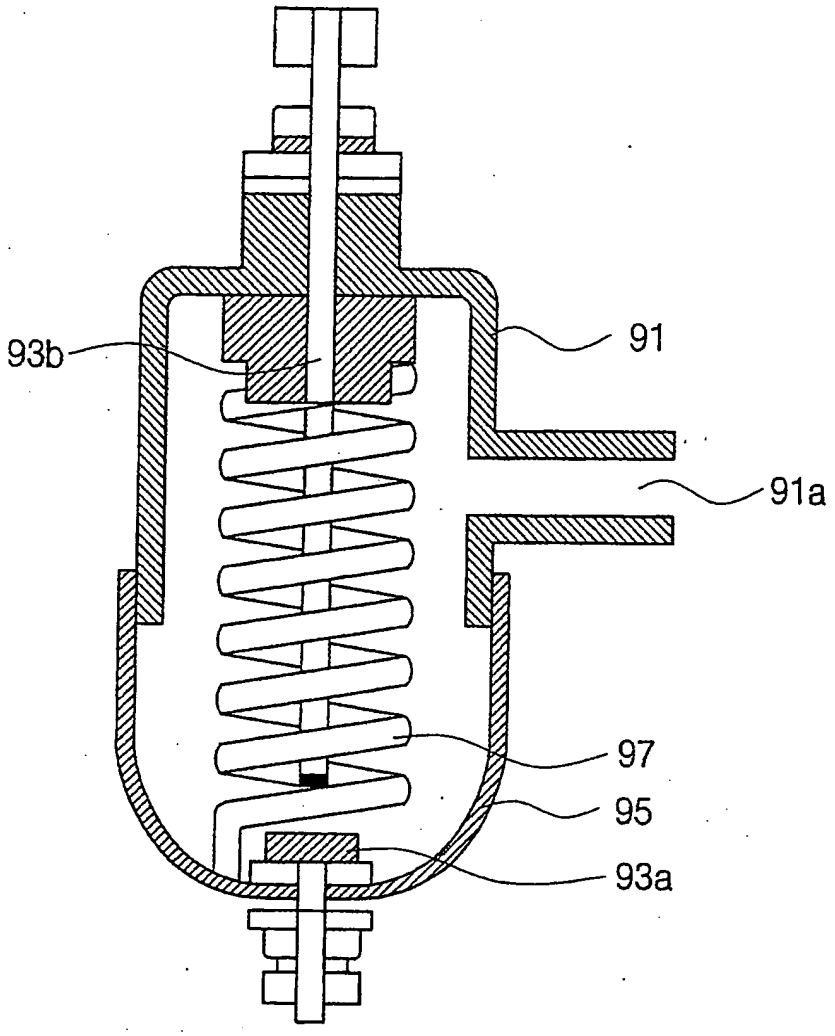


Fig. 14

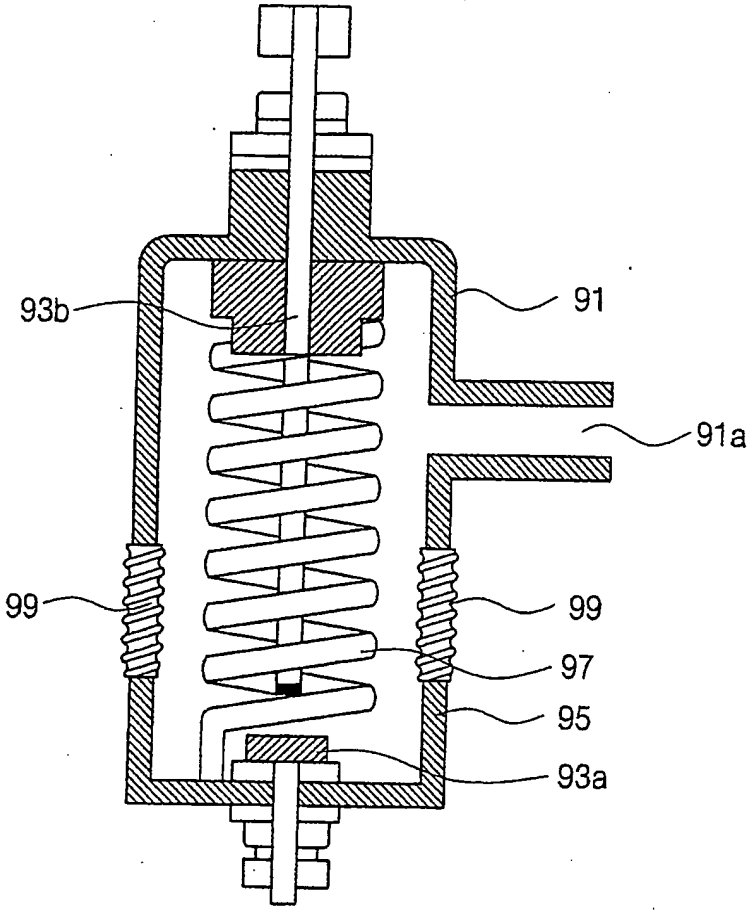


Fig. 15

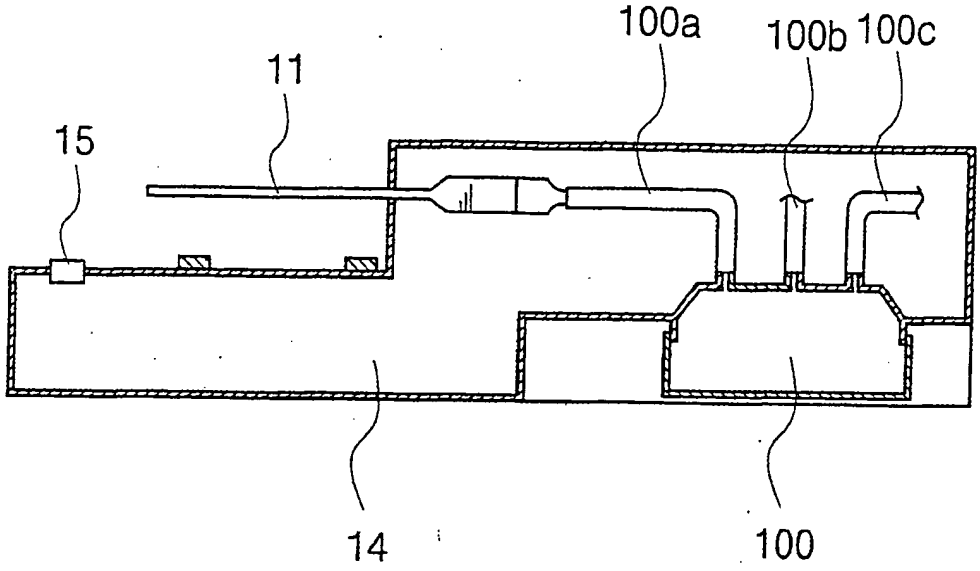
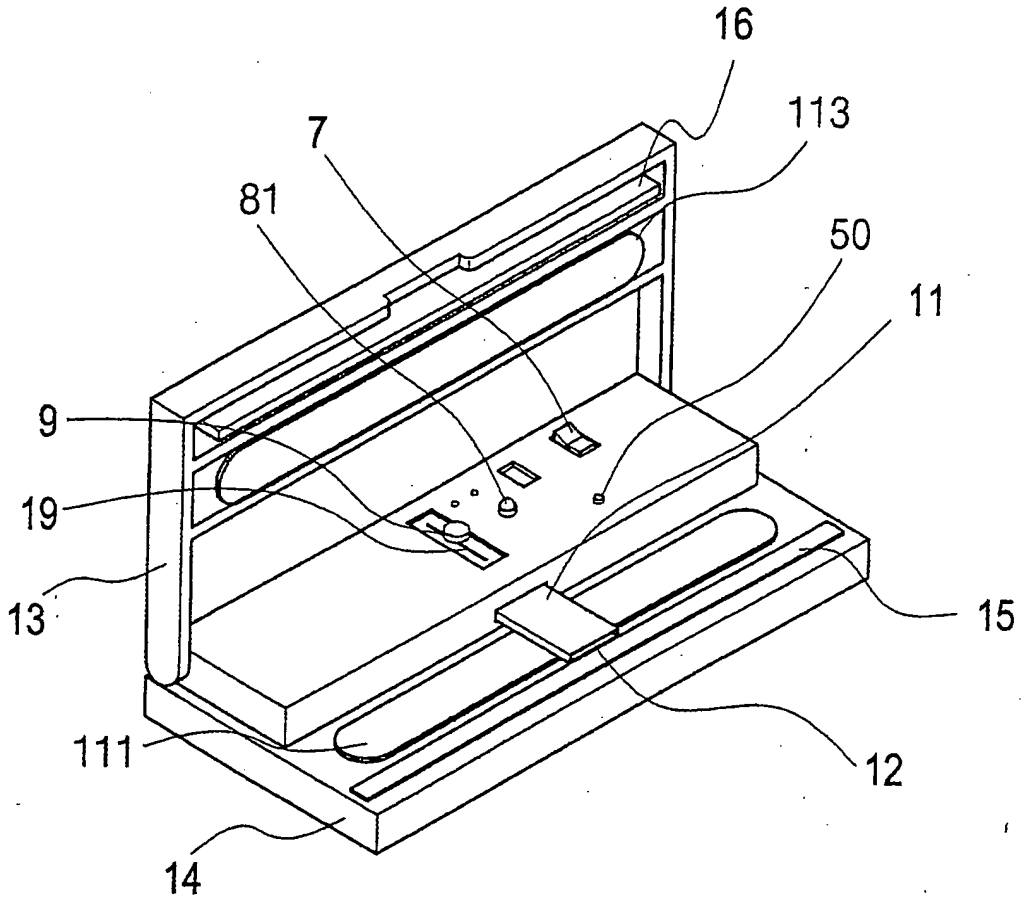


Fig. 16



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2004/000105

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 B65B 31/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 B65B 31/02,

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility Models and applications for Utility Models since 1975
Japanese Utility Models and applications for Utility Models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 62-159407 U (DONGYANG PRESS CO., LTD.) 09 October 1987 see the entire document	1-2 3-4, 9-10
X Y	KR 2002-8290 A (CHOI, HYUN-KOOK) 30 January 2002 see the entire document	1-2 3-4, 9-10
Y	US 4,941,310 A (Tillia Aktiengesellschaft) 17 July 1990 see the entire document	3-4, 9-10

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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Date of the actual completion of the international search	Date of mailing of the international search report
20 MAY 2004 (20.05.2004)	20 MAY 2004 (20.05.2004)

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2004/000105

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 62-159407 U	09-10-1987	None	
KR 2002-8290 A	30-01-2002	None	
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